



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/535,125	01/06/2006	Monika Ivantysynova	18062	5742
25542	7590	05/11/2010		
CNH AMERICA LLC INTELLECTUAL PROPERTY LAW DEPARTMENT PO BOX 1895, M.S. 641 NEW HOLLAND, PA 17557			EXAMINER WILLIAMS, MAURICE L	
			ART UNIT 3611	PAPER NUMBER
			MAIL DATE 05/11/2010	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/535,125

**Applicant(s)**

IVANTYSYNOVA ET AL.

**Examiner**

MAURICE WILLIAMS

**Art Unit**

3611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 April 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 and 17-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17-19 is/are rejected.
- 7) ☒ Claim(s) 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/GS-08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☒ Other: Examiner's Appendix (translation)

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-10, 11 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faun-Werke (DE 2,161,456) in view of Colston (US 3,904,042) and Sprinkle et al. (US 2003/0013575).

Faun-Werke discloses a hydraulic pump (22) with a reversal of delivery (23, 24; see also ¶ 16, ln. 5 of the Examiner's Appendix - provides for the *respective* suction side of lines 23, 24 indicating that both lines are capable of performing that function) in communication with a hydraulically operated device (6, 7), at a centre point (axis 4) of a vehicle. ¶ 26 (Examiner's Appendix) of Faun-Werke explain that the hydraulically operated device may be a vane rather than steering cylinders.

Faun-Werke also discloses that the pump delivers pressure to a first and second steering side (¶ 15, ln. 1-3) and a controller (15) configured to received a steering angle signal (from comparison of 10, 11) which controls the actuating pressure of the pump [¶ 14]

Faun-Werke does not directly disclose a motor with a fixed and moveable vane or a variable flow pump.

Colston discloses a motor (42) with at least one fixed vane (Fig. 2) and one moveable vane (43) wherein the vanes are connected to two different rotary components (col. 3, ln. 60-63). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to modify Faun-Werke as taught by Colston in order to provide a central force for actuating the articulation of the vehicle. Additionally, it would have been obvious to place the vane motor on the central axis in order to achieve the same results as the steering cylinders.

Sprinkle discloses a variable displacement pump (¶ 0027, ln. 1-2) with a swashplate (118), which controls the direction and displacement of a variable displacement pump (¶ 0033), that is controlled by a microprocessor (52), which is connected to a sensor (46). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to modify Faun-Werke as taught by Colston and Sprinkle in order to provide a means of changing the flow of the pump as well as a means of controlling the pump as the operating status of the vehicle changes (col. 4, ln. 62-65 states that it is clear that an electrical element may be used to signal the state of the vehicle).

Regarding claim 4: While Colston discloses a single motor in the rotary axis, it would have been obvious to a person having ordinary skill in the art at the time of the invention to include an additional motor, to provide additional power for the articulation of the vehicle, and to place the motor on the same axis.

3. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Faun-Werke in view of Colston and Sprinkle as applied to claims 7 and 11 above, and further in view of Moore et al. (US 7,061,466). Faun-Werke, Colston and Sprinkle

disclose as discussed above, but do not directly disclose a joystick connected to a controller. Moore discloses the use of a joystick (56 with a force feedback function; col. 2, ln. 9). The joystick can be used to for steering a vehicle (col. 3, ln. 1-3; col. 4, ln. 6—64). Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to modify Faun-Werke as taught by Colston, Sprinkle and Moore in order to provide an alternative means of steering a vehicle, requiring the use of only one hand.

***Allowable Subject Matter***

4. Claim 20 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

5. Applicant's arguments filed 10/08/2009, regarding the application of Armstrong teaching a reversal of direction for delivery of the pump and the force feedback of Sakamoto, have been fully considered and are persuasive. However, it is maintained that the application of Colston, teaching movable vanes connected to different mechanical parts, is proper.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAURICE WILLIAMS whose telephone number is

(571)272-4263. The examiner can normally be reached on Monday - Friday, 8 a.m. - 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lesley Morris can be reached on (571) 272-6651. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Maurice Williams/  
Examiner, Art Unit 3611

MLW  
May 4, 2010

/LESLEY D MORRIS/  
Supervisory Patent Examiner, Art Unit 3611

**Examiner's Appendix**  
(Description of Faun-Werke - translation)

[1] "Electrohydraulic steering device" = ~ = the invention relates to an electrohydraulic steering device for vehicles, in particular for break joint vehicles or for vehicles with two those which can be served independently steers inrichtun'en.

[2] It is already an hydrostatic steering device known, becomes direct operated with which of a steering wheel a control valve, which releases one of an oil pump required hydraulic stream with a steering angle to a corresponding steering cylinder. With a steered wheel an inductive transmitter or a potentiometer is connected, which is expenditure-steered with a pivotal movement of a wheel. This desired value being is connected with a similar is transmitter, which is with one the steering column associated intermediate shaft connected. This intermediate shaft is it a control member of the control valve drehfest and turningsoft connected with the other control member. With an operation of the steering wheel and a displacement of the desired value pointing value giver connected with the rufenen turning of the wheels hervorge thereby a signal becomes over an amplifier on a servomotor given of the bridge formed by the two transmitters, which affects the intermediate shaft and so that adjusts the control member not operated of the steering column and the actual value transmitter. In this way if a balanced one of the measuring bridge is effected, the placing switches engine off. Simultaneous one is the control valve thereby again closed, since the second control member is relative brought to the first control member into the closed position (DT-OS 1,947,205).

[3] This steering points these known hydraulic steering systems own disadvantage to all this aur that in the neutral Stelltnb of the steering column the continuous entire pump delivered flow between the pump and the oil reservoir circulated becomes. With vehicles with high Lenkträften are pump mechanical handling capacities up to approx.

[4] 600l/min required. To roll over additional oiler warming, unnecessary Durchwirbelung and SE llere aging of the hydraulic oil means these quantities of oil. In addition with such hydraulic steering systems, which exhibit a valve controller, temporary the pump delivered flow is squeezed off with the switching of the control valves, whereby partially. considerable pressure surges in the hydraulic system arise. This means additional oiler warming, increased Versehleßs of the pump and the remaining control elements.

[5] The invention is the basis the object to out-arrange an electrohydraulic steering device in such a way that such loads of the hydraulic system become avoided.

[6] This object becomes according to invention dissolved by the fact that with a steering column of coupled being and in Abhängigk.it of the pivotal movement of steered wheels of operated actual value givers to reversible promotion one category yellow acres

Hydraulic pump controlling target actual value circuit summarized are, whereby the hydraulic pump that or the Lenkzylinder or vane drives direct applied.

[7] Favourable way are in the hydraulic line between the hydraulic pump and that or the steering cylinders and/or. Vane drives of linking up valves to the stabilization of the wheel position provided.

[8] With this embodiment according to invention achieved becomes that as control member for the steering cylinders and/or. Vane drives serves. It becomes thus only pressurized oil promotion, if with operation of the steering wheel target actual value arises a difference between the two transmitters. Thereby it is further possible, the hydraulic lines between reversible conveyed category yellow arene hydraulic pump and the steering cylinders and/or. To hold vane drives very short.

[9] This hydraulic steering is particularly suitable therefore for vehicles, are required with which very large steering forces, like e.g. break-steered vehicles, and for vehicles with two independent voneinander it working steering devices, since between the steering columns and the hydraulic pump only cable guides are however no hydraulic hoses required. Such a steering works also self-correcting, since with an obligatory deflection of the wheels, for example due to road unevenness, arising due to which is - value difference immediately a corresponding practical delay-free more acting; the displacement working against hydraulic stream that or the steering cylinders conveyed becomes.

[10] By additional incorporation of linking up valves direct before the Lenkzylinder and/or. Vane drives become smaller shocks on the steering received, without at all although a slight displacement of the steering occurs. Thereby thus avoided becomes that the steering is to elastic.

[11] Other advantages and features of the invention result from the description of embodiments on the basis the drawing.

[12] In the drawing Fig show. 1 a steering device according to the invention with a break-steered vehicle, Fig. 2 a steering device according to the invention with one Vehicle with Ackermann steering, Fig. 5 a steering device according to the invention with one vehicle with a steered front and ge rear axle and two corresponding steered steer wheels.

[13] In Fig. 1 is the schematic frame 1 of a tractor shown, whose rear wheels are not more steerable 2, while their front wheels are 3 1 mounted pivotable over a break joint steering element around a break joint 4 at the frame. The steering movement made by means of two at the frame 1 on the one hand and at the axis 5 on the other hand mounted hydraulic steering cylinder 6 and/or. 7. Mit of the steering column 8 of a guidance handwheel 9 is a desired value being lo drehfest coupled. With the break joint 4 an actual value potent IO meter of 11 is likewise drehfest coupled, which is expenditure-steered with Schwenkbewegung towards the front wheels 5 from its layer.



[14] The taps 12 and/or. 13 of these potentiometers is 15 connected over an amplifier 14 on an electromagnetic servo valve. Depending on, which has potential target actual value a difference, an output 16 or 17 of this servo valve becomes 15 opened, whereby a corresponding application of an hydraulic servodyne 18 made. The servo valve 15 and the servodyne 18 are into a tax hydraulic system fed of an actuating pressure pump 19 20 connected.

[15] By the servodyne 18 the actuator 21/einer controllable axial or radial piston pump 22 from its zero position is swung out, so that one of the two to the steering cylinders. 6 and/or. 7 leading hydraulic lines 23 and/or. 24 with pressurized oil applied becomes. This leads depending upon that whether a positive or a negative being actual value difference between the potentiometers 10 and/or. 11 it besterit, in addition that the steering cylinder 6 on pressure and the steering cylinder 7 on train or reverse are stressed, whereby the front wheels 3 lead a corresponding steering movement out. The steering cylinders 6 and/or. 7 is over cross connected, i.e. the hydraulic line 23 leads to the pressure chamber of the steering cylinder 6 and to the course chamber of the steering cylinder 7, while those Hydraulic line 24 to the pressure chamber of the steering cylinder 7 and to the course chamber of the steering cylinder 6 leads. The pump 22 and the actuating pressure pump 19 become of the traction motor 25 of the vehicle fishing rod floated.

[16] Into the hydraulic lines 23 and/or. 24 is cheque valves 26 connected, backflows of the Hydraulikflüssigkeit of the associated chambers of the steering cylinders 6 and/or. 7 to the pump 22 prevent. Parallel ones to these cheque valves are to the hydraulic lines 23 and/or. 24 linking up valves 27 connected, which are so set that a backflow of hydraulic fluid by one of the lines 23 and/or. 24 to the respective suction side of the pump 22 only with exceeding of a certain pressure possible is. Thereby the steering becomes to a certain extent clamped, so that normal roadway impacts cannot cause deflection of the front wheels 3. If such shocks become so strong that the linking up valve 27 loaded on pressure comes up, the so effected displacement of the wheels 7 a displacement of the actual value potentiometer 11 connected thereby, which releases immediately again a control procedure of the already described type, so that the steering returns itself again - practical delay-free - into the being.

[17] Between the hydraulic lines 23 and 24 a pressure relief valve is 28 connected, that over cheque valves 29 with these hydraulic lines 23, 24 connected is, which are open in each case, if the corresponding associated hydraulic line becomes 23 or 24 loaded on pressure. On the other hand the pressure relief valve is 28 51 connected over a return line 30 with an oil tank. The return line 30 is finally still over cheque valves 32 with the hydraulic lines 23 and/or. 24 connected, which are so disposed that them with vacuum on one of the lines 23 and/or. 24 open are.

[18] The pressure relief valve 28 is so set that it short before the maximum stress of the pump 22 and/or. the lines 23, 24 or the steering cylinders 6, 7 or the axis 5 and/or. the wheels addresses 3. It serves for it, serves destruction or damage of the entire hydraulic

system and also the mechanical parts coupled thereby to prevent, if for example with a complete blockage of the front wheels - if these for example against a Hauswand or a wall are fixed - a self destruction of the hydraulic system would occur. If in such cases through tricks of the steering wheel 9 a being actual value difference generated will and so that by corresponding displacement of the pump 22 in either the hydraulic lines 23 or 24 an oversized pressure constructed became, since a V Stellung L-nkzylinder the not possible is, the pressure relief valve 28 opens and gives to the required amount of oil in the short-circuit over corresponding cheque valve 32 to the suction-side hydraulic line 24 and/or 23. In addition by the return line 30 leakage losses of the circuit supplemented can become.

[19] By corresponding choice of the V2stirker 14 achieved can become that the deflection of the servodyne 18 and thus L of the Stsil of member 21 of the fördermengenJregelbaren pump 22 and thus their capacity direct dependent is finally from an amount of the being actual value difference, so that with the removing of this difference before reaching the steering element terminator point the actuator and thus the FörderleStung are taken back.

[20] Thereby slow starting of the steering element terminator point becomes achieved, which shows up in a soft guidance behavior. That ollwert and the actual value potentiometer lo and/or. 11 becomes 33 fed of a common DC voltage source.

[21] The actuating pressure pump 19 reaches more blbehälter 31 shorted over a pressure relief valve 54, if because of absence of a target actual value difference both outputs 16 and/or. 17 of the servo valve 15 closed is.

[22] The embodiment in accordance with Fig. 2 differs from in accordance with Fig. by the fact 1 only that is provided in place of a break joint steering element an Ackermann steering.

[23] Here the two steering cylinders 6, 7 are 36 replaced by a double acting steering cylinder acting on the tie ranging 35, whose has both chambers same effective cross section, so that in each case over an hydraulic line the 23 and/or. to 24 into a chamber printed quantity of oil from other chamber the squeezed out corresponds. The actual value potentiometer 11 is appropriately direct 37 connected with a kingpin.

[24] In Fig. 5 is an embodiment shown, itself of in Fig. it differentiates between 2 represented by the fact that front ones are more steerable wheels 5 and rear wheels 2 by means of a Achssclienkellenkung and that in front and in the back at the vehicle a steering wheel 9 and/or. 9' provided is. The rear wheels 2 follow the Schwenkbe over a linkage clutch 58, which can be also hydraulic or electric formed if necessary, moving in opposite directions wegung the front wheels 5.

[25] the steering columns 8 and/or. 8' of the steering wheels 9 and/or. 9' is same in each case desired value being lo and/or. lo' connected, which alternatively over a corresponding switch 59 with the actual value potentiometer connected to become to be

Art Unit: 3611

able, so that the vehicle can become either by means of the steering wheel 9 or the steering wheel 9' at the two ends of the vehicle steered.

[26] In place of the target actual value being loj 11 can become also inductive transmitters provided, so that in place of a tension comparison a current comparison made. The other the control of the delivery-controllable hydraulic pump can become 22 also electric or pneumatic made. Instead of the steering cylinders 6, 7 and/or. 56 can become also oil engines as vane drives used.

[27] With use of delivery-controllable radial or axial-piston pumps, which promotes in the zero position of the actuator 21 still another no-load operation delivery, whereby such a no-load operation delivery constitutes at the most 1 to 3% of the operating delivery, is to the hydraulic line 23 and/or. 24, into which this no-load operation quantity of conveyed will attach, one to the oil reservoir 51 leading no-load operation line, into which a rotating valve to be switched is, which becomes closed with occurrence of a Joll be value difference. By this no-load operation quantity from the corresponding other hydraulic line the 24 and/or: 23 withdrawn amount of oil then continuous over the return line 30 becomes and corresponding cheque valve 52 replaced.

[28] With the steering column 8, 8 a gear wheel reduction gear connected can be, at its output the potentiometer lo and/or lo' connected is. Thereby achieved can become that the desired value being become lo, lo' and the actual value potentiometer 11 complete similar formed and also with a certain rotation of the steering wheel and a corresponding associated turning of the wheels around a naturally very many smaller angle a same in each case rotation to implement. If necessary also the actual value potentiometer becomes 11 over a corresponding transmission driven. On the other hand thereby achieved can become that the double full steer in chlag the full pick-up range of a potentiometer associated becomes, whereby the sensibility can become significant increased.